Cisterns and Irrigation System at EPA West

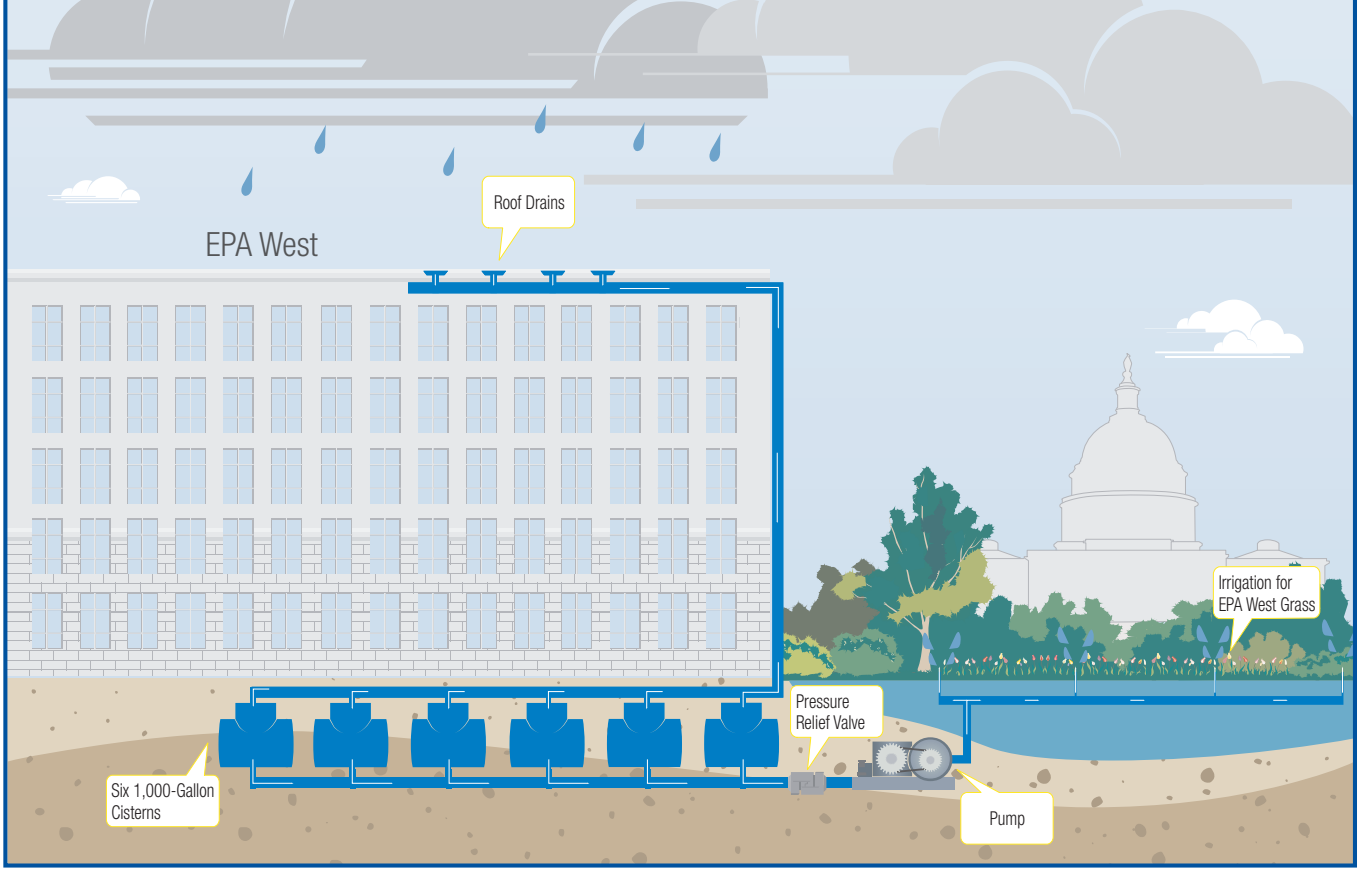
Cisterns have been used since ancient times to collect and store water for a variety of uses, including irrigation and drinking water. EPA installed these cisterns to achieve the following goals:

- Reduce runoff and overflows of wastewater (i.e., combined sewer overflows, or CSOs)
- Demonstrate that EPA is doing its part to protect the Chesapeake Bay from runoff and CSOs
- Promote and demonstrate sustainable stormwater management practices
- Reduce the amount of potable water used for irrigation
- Reduce energy consumption and greenhouse gas emissions by decreasing the volume of potable water that needs to be treated and pumped

The six 1,000-gallon cisterns in the garage of the EPA West building store rainwater collected from the roof of the building. The rainwater is then pumped outside and used to irrigate the landscaping along Constitution Avenue.

How Does the System Work?

An automated, Web-based program controls the system. The system irrigates a 13,500-square-foot area of landscaping with a maximum of 1 inch of water per week (the amount needed for typical urban landscapes), provided that an adequate rainwater supply has accumulated. The harvested rainwater is pumped from the cisterns several mornings per week from May to October. A rain sensor on the exterior of the building automatically shuts off the system if it rains during an irrigation cycle.



Irrigation System Components

A Stormwater Collection System

Rainwater is harvested from approximately 10,000 square feet of the roof. The water flows into two drains, which are connected by pipes to the garage cisterns.

B Cisterns

There are currently six 1,000-gallon plastic cisterns, but the system was designed to support up to 20 cisterns. The six cisterns hold enough water to irrigate the landscaped areas for 1-1/2 weeks. When there is an inadequate volume of rainwater, the system uses potable water for irrigation.

C Float Switches

Each cistern contains three float switches: "high water," "low water," and "alarm." The "high water" switch closes the green electronic automatic valve, allowing excess water to be diverted to the storm drain. The "low water" switch closes the black pneumatic valve, which controls water outflow to the irrigation system. The "alarm" switch sets off a strobe light and alarm if the green electronic valve fails to close when the cisterns are full and overflow water is not diverted to the city storm drain.

D Strainer

A strainer in the bottom of each cistern removes large pieces of dirt and debris in the rainwater before it flows through the irrigation pump and water lines. Strainers must be cleaned periodically.

E Cistern Control Box and Starters for Irrigation Pumps 1 and 2

Cistern controls were designed to pump the rainwater or potable make-up water used to irrigate the landscaping at approximately 20 gallons/minute at 50 pounds per square inch (psi).

F Pumps

Two pumps alternate to pump water from the garage cisterns to the irrigation heads 20 feet up at street level.

G Pressure Tank

The system also includes a pressure tank that provides a buffer to prevent excessive pump cycling and protect against undue pressure in the pipes in the event of a control failure.

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